GREY SEAL (Halichoerus grypus) DISTRIBUTION DURING 1983/84 IN THE GULF OF ST. LAWRENCE AS OBSERVED BY AERIAL SURVEY

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ABSTRACT

Clay, D. and G. Nielsen. 1985. Grey seal (Halichoerus grypus) distribution during 1983184 in the Gulf of St. Lawrence as observed by aerial survey. Can. MS Rep. Fish. Aquat. Sci. 1836: iii + 8p

Distribution of grey seals was estimated in May, August, November and January from aerial surveys of the Gulf of St. Lawrence. The only major concentrations observed were the 'moulting' or haul out on Anticosti Island in May and the 'pupping' in the Northumberland Strait area in January. Other minor concentrations occurred in southwestern Newfoundland in August and on Deadman's Island in November and January.

Seal distribution followed very closely upon the boundaries of National Parks, inaccessible islands and rugged cliff beaches. One factor probably affecting distribution was the presence of people on beaches which were inaccessible before 'ATVs' and skidoos.

The maximum estimated number of seals at the time of the January survey was 7,000, while the maximum observed on any one flight was approximately 2,300. This suggests a population in the Gulf of between 5,000 and 10,000 animals.

RESUME

Clay, D. and G. Nielsen. 1985. Grey seal (Halichoerus grypus) distribution during 1983/84 in the Gulf of St. Lawrence as observed by aerial survey. Can. MS Rep. Fish. Aquat. Sci. 1836: iii + 8p.

La distribution du phoque gris fut estimée par relevé aérien du Golfe de Saint-Laurent aux mois de mai, août, novembre et janvier. Les seules concentrations importantes observées étaient sur la côte de l'île d'Anticosti lors de la mue au mois de mai, et au Détroit de Northumberland lors de la mue au mois de mai, et au Detroit de Northumberland lors de la mise bas en janvier. D'autres concentrations mineures furent trouvées dans le sud-ouest de Terre-Neuve au mois d'août et sur le Corps Mort en novembre et en janvier.

La distribution du phoque suit de très près les frontières des parcs nationaux, les îles inaccessibles et les plages avec falaises rocailleuses. La distribution fut sans doute influencée par la présence de personnes sur des plages autrefois inaccessibles, avant la venue des motoneiges et des véhicules "tout-terrain".

L'estimation maximale du nombre de phoques pendant le relevé de janvier fut de 7,000 alors que le nombre maximal observé sur n'importe quel vol fut d'environ 2,300. Ceci indique que la population dans le Golfe serait de 5,000 à 10,000 animaux.

INTRODUCTION

The grey seal, Halichoerus grypus, is distributed throughout the North Atlantic; it can be both gregarious and solitary at different times of the year. In the Northwest Atlantic the two major stocks, identified by breeding grounds, are those from Sable Island (NAFO Divisions 4VW) and those from the southern Gulf of St. Lawrence (NAFO Division 4T) (Mansfield and Beck, 1977). Both of these stocks have been studied for many years; however, much less is known about that from the Gulf due to the greater difficulties working on vast, drifting ice floes compared to an island environment.

Over the last decade, a great deal of renewed interest has developed in the grey seal. A major factor in this emphasis is the codworm (Phocanema decipiens), a nematode parasite carried by the grey seal for a part of its life cycle. Much of the remaining part of the codworm's life cycle is spent encysted in the flesh of economically important fish (cod, plaice and to a lesser extent most other groundfish species). This problem has increased the pressure for a more detailed stock assessment of this species.

Stock assessments of grey seals are difficult as no commercial harvest is conducted and thus no catch data are available. Assessments have been attempted using data from tag and recapture studies and from aged samples collected by both 'scientific shot-samples' and a 'bounty kill' (Zwanenburg, MS 1984). One of the major weak points in these calculations is the lack of an in-dependent estimate of the number of grey seals in the Gulf of St. Lawrence. Four aerial surveys were conducted in May, August, and November 1983 and January 1984 January 1984 as a preliminary attempt to delineate seasonal distribution of these animals and to provide an estimate of the minimum total numbers of grey seals in the Gulf of St. Lawrence.

METHODS

These surveys were flown in a chartered twin engine Piper Navajo at an average speed of 110 knots, an altitude of 30 to 40 m above sea level, and approximately 50 m offshore. All major islands were surveyed (including Wolf, St. Paul, Sept-Isles, Iles de la Madeleine, Brion, Bird Rock, Deadman, Amet, Pictou, and Anticosti Islands but excluding Prince Edward Island). The many thousands of islands along the north shore of the Gulf of St. Lawrence from Cape Whittle to the Labrador/Quebec boundary were covered by a zig-zag flight path from the mainland to the outer edge (some 5 km offshore). Large islands and fiords in this archipelago were surveyed individually. The St. Lawrence River was surveyed to Matane on the south shore and Pte des Monts on the north shore.

No line transects were flown offshore except in the January survey when some low level flights were conducted over the open water and ice of the middle Gulf.

The seals were counted by two observers using tape recorders for recording number of seals and time of observations. One observer in the co-pilot's seat (right-hand side) also recorded time versus location on a map throughout the survey. The second observer, sitting in the rear, photographed large concentrations of seals for later count verification.

All surveys were conducted in a counter clockwise direction to enable an unimpeded view of the shore and beach area from the co-pilot's seat.

RESULTS

FLIGHT #1 MAY 1983

This survey took place from 23 to 26 of May 1983 and required 30.6 hours flying time and 12 landings.

The first day covered from Matane, Quebec on the south shore of the St. Lawrence River to Cape George, Nova Scotia (Fig. 1). The only seals observed in this area were the 16 around Forillon National Park and Baie de Gaspé in Quebec. No seals were observed along the coastal sandbars of the Miscou, Miramichi, and Richibucto regions of New Brunswick or on Amet Island, Nova Scotia, although there was one unverified observation of two swimming seals near Pugwash, Nova Scotia. Three wheel ATV's were observed on the sandy beach areas of northern New Brunswick (Miscou to Richibucto). The noise from these vehicles may cause the seals to disperse offshore during daylight hours.

The second day covered the coast from Cape George, Nova Scotia to Havre-Saint-Pierre on the Gulf north shore, Quebec. On this leg, only 7 seals were observed. These were north of Cape Anguille in St. George's Bay, southwestern Newfoundland. Ice and some snow were observed north of Point Riche, Newfoundland. Temperatures were at a high of +1 to +3°C along the Gulf shore of northern Newfoundland to St. Anthony and along the Gulf north shore of Quebec to Natashquan. No seals were observed although there were large expanses of uninhabited coast. Between Ile Greenly and Iles Sainte-Marie, Quebec, there are several thousand small weathered rock islands; no seals were observed on or near any of the outer islands nor in any of the fiords or large estuaries.

The third day we were grounded by bad weather at Sept-Iles, Quebec.

On the fourth day the Gulf north shore (Quebec) was surveyed from Havre-Saint-Pierre to Pte des Monts on the St. Lawrence River; on the same day Anticosti Island and Iles de la Madeleine were surveyed (Fig. 2). No seals were observed along the Gulf north shore. A minimum of 2232 seals were observed on Anticosti Island. No seals were observed on Iles de la Madeleine.

The noise of the aircraft disturbed many of the seals resting on the beaches. After one pass the herds would often stampede into the water. The pelagic observations would be an absolute minimum as the seals only raised their noses and eyes out of the water to observe the aircraft. The majority of seals counted on Anticosti Island were shore based in herds of 25 to 1000 animals.

FLIGHT #2 AUGUST 1983

This survey took place from 15 to 19 of August 1983 and required 36.1 hours flying time and 14 landings.

The first day covered from Gaspé, Quebec on the south shore of the St. Lawrence River to Cape North on Cape Breton Island, Nova Scotia (Fig. 3). Forty five seals were observed on the Gaspé peninsula and 10 were seen in Kouchibouguac National Park, New Brunswick. However, Parks Canada staff were conducting a continuing "on ground survey" in the park and had recorded about 30 seals at the time of the survey (Fig. 3). These seals are prone to frequent disturbance by fishing boats leaving

and arriving from the area. No seals were observed on Amet Island, although approximately 25 were observed near Pugwash, along the Nova Scotia mainland shore. Two herds of harbour seals totalling 22 were also observed in this area.

The second day covered the western Newfoundland coast from Port-aux-Basques to St. Anthony. On this leg, we observed 195 juvenile grey seals. These were all around Cape Anguille in southern Newfoundland. Mixed amongst these seals were two groups (totalling 8 animals) of harbour seals. Temperatures were at a high of over 20°C along the Gulf shore of northern Newfoundland to St. Anthony. No seals were observed, although there are large expanses of uninhabited rocky coast. One dead beached whale was observed at St. Barbe Harbour in northern Newfoundland.

The third day we were closed in by weather at St. Anthony, Newfoundland.

On the fourth day the north shore of Quebec and southern coast of Labrador were surveyed from L'anse au Loup to Sept-Iles. No seals were observed along these shores.

On the fifth day, Anticosti Island and the Iles de la Madeleine were surveyed (Fig. 4). A minimum of 706 live seals were observed on Anticosti Island and eight dead adult greys were observed on the beaches. A section of the northern coast was missed due to thick fog banks; it is estimated that an additional 100 seals were missed in this section. There were contract hunters collecting specimens for the Department of Fisheries and Oceans at this time. No seals were observed on the Iles de la Madeleine.

This survey was conducted at the peak of the tourist season (mid August),and the heavy use of the beaches by recreational vehicles, especially in New Brunswick, may be a major factor controlling "visible" grey seal distribution. Hunting was evident on the south coast of Anticosti Island, possibly contributing to the higher percentage of pelagic seals in this survey and the apparent increased nervousness of the seals at the noise of the approaching aircraft. Some road building was also occurring along the southwest coast of Anticosti Island.

FLIGHT #3 NOVEMBER 1983

This survey took place from 9 to 14 of November 1983 and required 28.1 hours flying time and 9 landings.

The first day covered from Ste-Marthe-de-Gaspé, Quebec on the south shore of the St. Lawrence River to Cape Tormentine, New Brunswick (Fig. 5). The only seals observed in this area were in Forillon National Park (150) and Kouchibouguac National Park (100). No seals were observed along the coastal sandbars of the Miscou or Miramichi regions. Evidence of heavy recreational vehicle traffic was again observed in this area. Two harbour seals were seen at the approach to Baie de Chaleur, Quebec.

The second day covered the coast from Cape Tormentine to St. Anthony, along the western shore of Newfoundland. On this leg we observed seals on Amet Island for the first time, and a hunter on the island shooting at seals in the water. Harbour seals were observed along the coast near Pugwash. No seals were observed on St. Paul Island. There were only a couple of seals on the south-west coast of Newfoundland around Cape Anguille. This was a great change from the high numbers observed in August. Some snow was observed north of Corner Brook on the west coast of Newfoundland. Temperatures were at a high of -5 to -1°C along the Gulf shore of northern Newfoundland to St. Anthony. Fisheries Officers (from the Department of Fisheries & Oceans in this region) have noted that grey seals are often observed in freshwater basins along this coast, i.e. the 'ponds' (Ten Mile Pond, etc.) located in the gravel of the coastal lowlands. We did not observe any seals in these areas during any of our surveys.

On the third day we covered the north shore of Quebec. No seals were observed although there were large expanses of uninhabited coast. Thick snow and temperatures of -10°C were common. Hunters were observed in boats along this coast. Between Ile Greenly and Iles Sainte-Marie in Quebec, there are several thousand small weathered rock islands, but only one seal was observed amongst them.

The fourth day we were prevented from flying by bad weather at Natashquan, Quebec.

On the fifth day the Quebec north shore of the Gulf was surveyed from Natashquan to Pte des Monts on the St. Lawrence River, as well as Anticosti Island and Iles de la Madeleine (Fig. 6). Only two seals were observed this day along the north shore. A minimum of 714 seals were observed on Anticosti Island. On this survey 300 grey seals were observed on Deadman's Island in the Iles de la Madeleine.

FLIGHT #4 JANUARY 1984

This survey took place from 16 to 22 of January 1984 and required 20 hours flying time and 6 landings.

The first day covered from Matane, Quebec on the south shore of the St. Lawrence River to Gaspé, thence to Sept-Iles to overnight (Fig. 7). Only four seals were observed in this area, two of them in Forillon National Park and two outside the park but near the upstream end. We flew from Gaspé to Sept-Iles and, although there was almost complete ice coverage, we observed no seals; this transect was made at an altitude of 300 meters at 130 knots.

The second day we covered both coasts of Anticosti Island and a 80 kilometer stretch of the north shore on the eastern side of Sept-Iles. (Fig. 8). Only two seals were observed on Anticosti. The first ice was continuous along the northern shore with broken leads of open water scattered throughout. There was open water along the southeast shore with shore-fast ice becoming the dominant feature by Southwest Point.

A line transect was flown from Southwest Point to Miscou Island at an altitude of 75m and a speed of 150 knots but no seals were observed. From Miscou the coast was surveyed southward, the first seal being observed on the southern boundary of Kouchibouguac National Park. There was heavy skidoo activity along the entire New Brunswick coast except within the park. Two more seals observed before Cape Tormentine.

The third day we were grounded in Moncton due to bad weather.

The fourth day we started at Baie Verte, New Brunswick. Seals were first observed at Amet Island, where 80 adults and 40 pups were present. No seals were observed for about the next 15 kilometers, then scattered groups of from two to 60 were observed from Pictou Island to Cape George on St. Georges Bay, Nova Scotia. In this area 170 adults and 106 pups were counted along a line transect. This transect line, approximately 50 km long, covered a strip of 500 m on either side of

was estimated that 'habitable' ice was about 25 km wide in this part of Northumberland Strait. Extrapolation of our results to this total area gave an approximate estimate of 4250 adults and 2650 pups.

St. Georges Bay was free of ice and the west coast of Cape Breton had only minor pans of "slush ice" several kilometers offshore. A low level flight was carried out via St. Paul Island to Port-aux-Basques. No seals were observed from here all the way to Stephenville. We did another low level line transect beginning 75 kilometers out from Bird Rock to the Iles de la Madeleine (Brion Island, Entry Island, etc.) and Deadman's Island. The only seals observed were 210 adults and 190 pups on Deadman's Island.

The number of seal pups tagged on Deadman's Island by Department of Fisheries & Oceans staff from the Arctic Biological Station, Ste Anne de Bellevue, was within 5% of the above count, while the number of pups tagged on Amet Island was 100% greater than the number we observed. One possible reason for the discrepancy is the difficulty in defining the boundaries of Amet Island when it is entirely covered in ice and snow. A second problem is the pronounced heaving of the ice around the Island which often hides the seals, especially the pups.

CONCLUSIONS AND DISCUSSIONS

An estimate of the size of a visible herd of 250+ seals probably has a precision of no more than +20%. Therefore, the numbers of animals on shore are considered to be fairly representative of those actually present while no real estimate can be made of those at sea, except that they would be in excess of those counted off shore.

Many factors affect the visibility of seals from the air. The type of coastline is of prime importance since the size and frequency of indentations determines how close the aircraft can follow the shore. Coastlines such as those along the north shore of Quebec and Labrador are impossible to census accurately owing to the large number of islands present. Some parts of the coastline of Anticosti Island with 1-2 km wide rocky tidal flats are also difficult to census with confidence.

Another important factor affecting the observers in an aerial census is the position of the aircraft relative to the sun. The sun can reduce visibility and cause extreme fatigue on long summer days. The type of aircraft is also very important, some being much easier to observe from than others.

The time of day may be an important criterion in the location and gregariousness of grey seals. Our surveys ranged in length from an 18 hour day in May to 6 hour days in January. No account can be made for the time of day in these surveys.

Our observations have led to the following hypothesis on the distribution and movement of grey seals in the Gulf of St. Lawrence (Table 1). Starting in May when the moult begins, seals move northwards and congregate at Anticosti Island, the only area in the Gulf of St. Lawrence relatively undisturbed by humans. Although the north shore of Quebec is sparsely inhabited, the few inhabitants travel actively by boat and ATV making much of the coastline unsafe for large numbers of seals to haul out.

In the summer months the adults that went north in the spring stay there for the most part, while adults and pups move back into the Gulf from the Sable Island colony. This latter conclusion is drawn from this survey and tag returns over the past several years (Beck pers. comm.). These immigrants spread out north and south of Cabot Strait and some seals also begin to disperse from the Anticosti Island concentrations.

By late fall the northern herds are moving south along the Quebec/New Brunswick shores, via the Iles de la Madeleine towards Northumberland Strait.

At the beginning of the pupping season in late December, most seals have moved to the Iles de la Madeleine and Northumberland Strait.

As this hypothesis would result in an ever expanding population in the Gulf there must be some emigration from the Gulf. It is likely that pups and adults are borne out of the Gulf on the pack ice that drifts out of St. Georges Bay and along the western Cape Breton area out to the Sydney Bight (NAFO division 4V), some eventually reaching Sable Island (Beck, pers. comm.).

ANECDOTAL DATA

Several independent accounts from St. Anthony, Newfoundland have reported large concentrations of grey seals along the coast of Labrador from Henley Harbour north to Mary Harbour. These accounts generally referred to the late 1960's and early 1970's.

Along the north shore of Quebec from Havre St. Pierre to Natashquan several residents reported the common practice of going to Anticosti Island to hunt for deer and grey seals. This suggests that many of the grey seal bounty kills recorded for the north shore may in reality be from Anticosti Island.

ACKNOWLEDGMENTS

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REFERENCES

Mansfield, A.W. and B. Beck (1977). The grey seal in eastern Canada. Can. Dept. Fish. and Envir. Tech. Rept. 704.

Zwanenburg, K. (1984). An assessment of the Northwest Atlantic grey seal (Halichoerus grypus) population for 1983. Can. Atl. Fish. Sci. Advis. Comm. Res. Doc. 84/9.

Table 1. Minimum numbers of grey seals observed (counted) and estimated for six areas of the Gulf of St. Lawrence.

	Newfoundland South	Newfoundland North	North Shore	Anticosti	Gaspé	Iles de la Madeleine	Northumberland Strait	TOTAL Obs.	TOTAL Est.
May	7	0	0	2232	16	0	0	2255	2255
Aug	195	0	0	706	45	0	38	984	1084
Nov	2	0	3	714	151	300	111	1280	1280
Jan	0	-	-	2	4	400	396	802	7306

- = No survey

FIGURE 1

Aerial survey of the Gulf of St. Lawrence, May 1983. Numbers in the water refer to pelagic sightings while those inland refer to animals on shore.

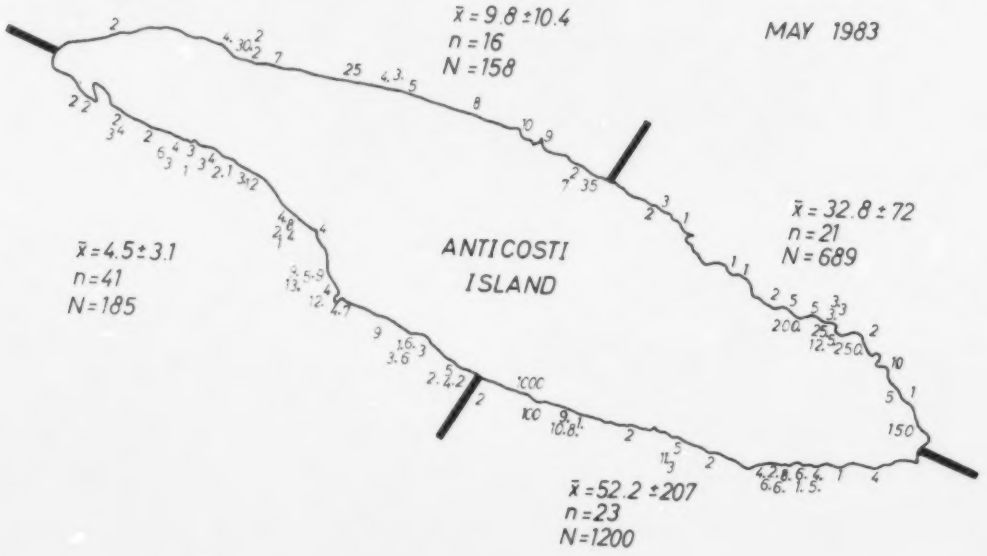

FIGURE 2

Aerial survey of Anticosti Island, May 1983. The 'x' refers to mean herd or group size (with standard deviation), the 'n' refers to the number of herds or groups, and 'N' refers to the total number of animals observed.

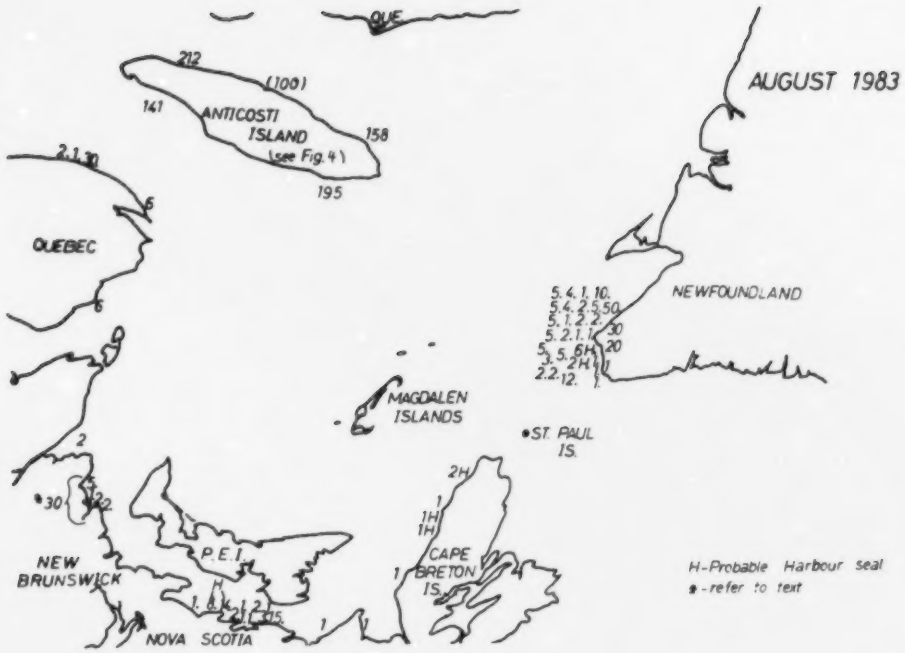

FIGURE 3

Aerial survey of the Gulf of St. Lawrence, August 1983. (See caption Figure 1.)

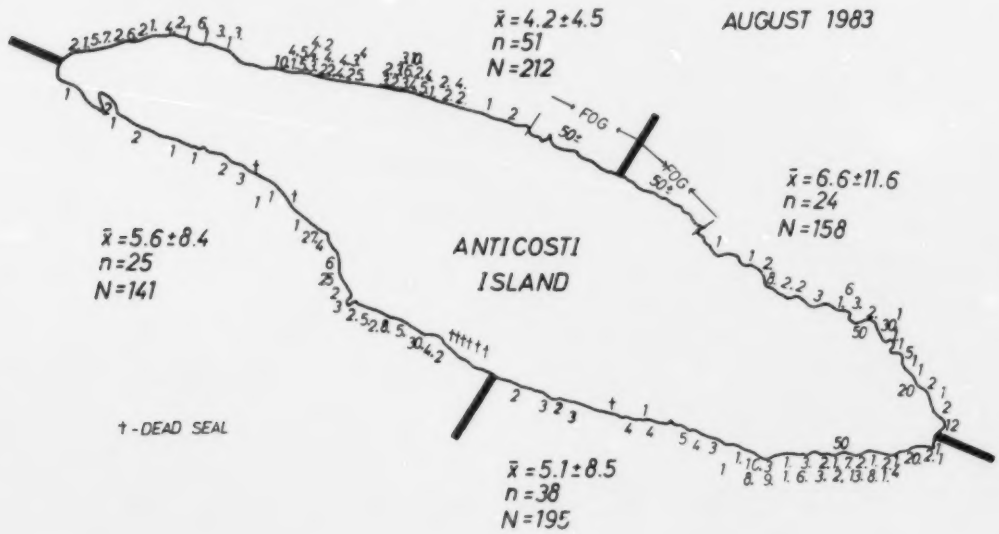

FIGURE 4

Aerial survey of Anticosti Island, August 1983. (See caption Figure 2.)

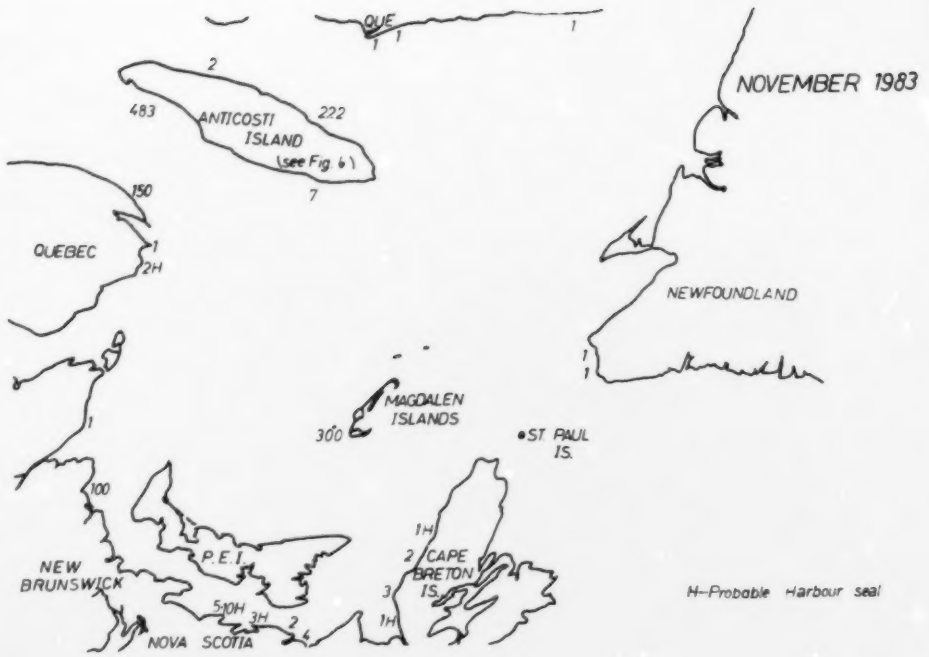

FIGURE 5

Aerial survey of the Gulf of St. Lawrence, November 1983. (See caption Figure 1.)

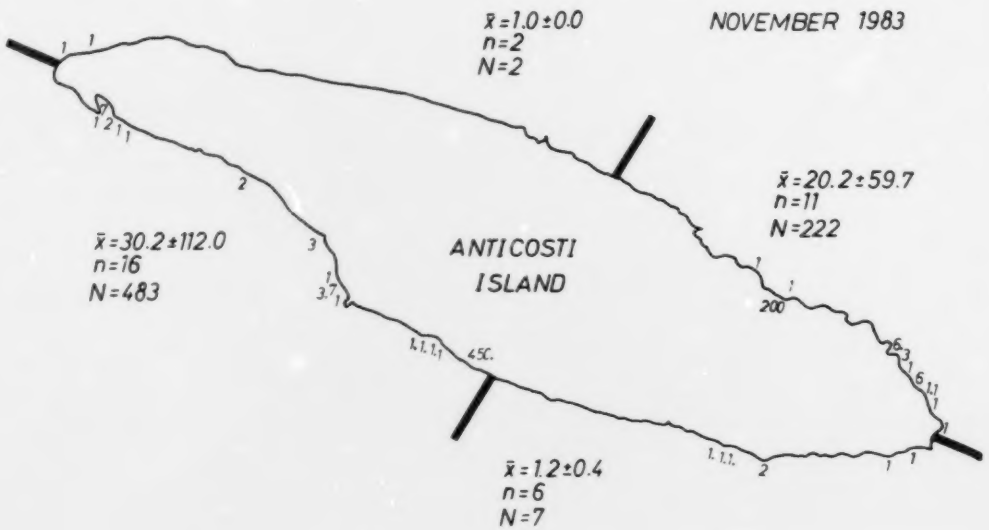

FIGURE 6

Aerial survey of Anticosti Island, November 1983. (See caption Figure 2.)

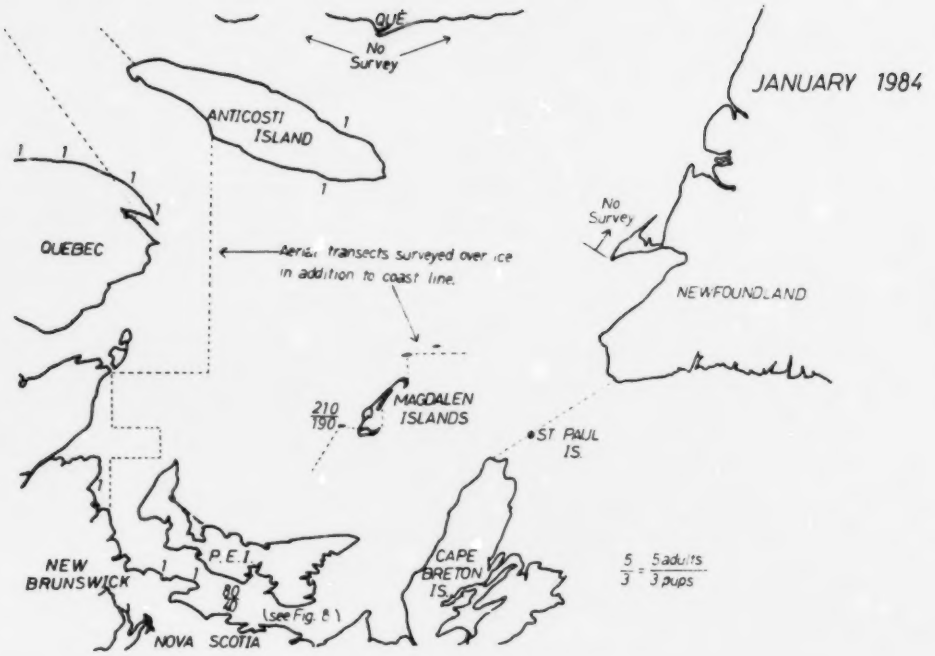

FIGURE 7

Aerial Survey of the Gulf of St. Lawrence, January 1984. (See caption Figure 1.)

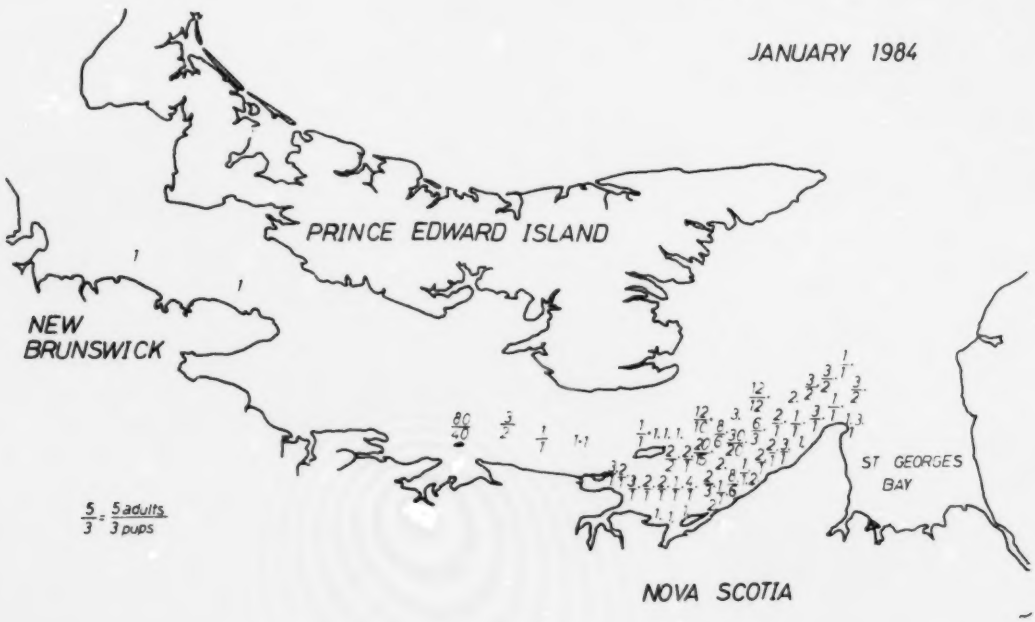

FIGURE 8

Aerial survey of Northumberland Strait, January 1984. (See caption Figure 1.) The fraction style numbers indicate the numbers of adults (numerator) and pups (denominator).